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THE ROLE OF DEVELOPMENT FINANCE INSTITUTIONS (DFIS) IN PROMOTING THE CLEAN DEVELOPMENT MECHANISM (CDM) IN AFRICA

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Abstract. This article outlines some of the latest developments and opportunities for development finance institutions[1] (DFIs) to become directly supportive of the Clean Development Mechanism (CDM[2]) in Africa. In striving to make development financing more environmentally friendly and sustainable, DFIs can play a key role in promoting the CDM on the African continent by providing monetary incentives through their project financing activities; encouraging and facilitating partnerships in support of sustainable development, particularly with reference to the CDM, and; providing technical advice and support to clients with regard to project design, planning and implementation.

DFIs have traditionally focused on financing infrastructure and poverty alleviation projects. However, the emergence of the CDM has brought about a shift towards investments in services and products that reduce carbon dioxide emissions and encourage investments in environmentally friendly technologies. This can be ascribed in part to the development of a ''carbon market'' under the auspices of the Kyoto Protocol that took effect in February 2005. The carbon market and emerging carbon funds are some of the main drivers enabling DFIs to play an increasingly important role in promoting the CDM in Africa.

Key words: clean development mechanism, development financial institutions, environment, innovative environmental markets, investments, sustainability.

Abbreviations: CDM: – Clean Development Mechanism; CER: – Certified Emission Reductions; COP: – Conference of Parties to the United Nations Convention on Climate Change; DBSA: – Development Bank of Southern Africa; DFI: – Development Finance Institution; ET: – Emissions Trading; GDP: – Gross Domestic Product; GTZ: – Deutsche Gesellschaft für Technische Zusammenarbeit Gmbh; IFC: – International Finance Corporation; IMF: – International Monetary Fund; ISO: – International Standard Organization; JI: – Joint Implementation; JPOI: – Johannesburg Plan of Implementation; LULUCF: – Land-use, Land-use Change and Forestry; NEPAD: – New Partnerships for African Development; ODA: – Overseas Development Assistance; PPP: – Public, Private, Partnerships; UNEP: – United Nations Environment Programme; UNFCCC: – United Nations Framework Convention on Climate Change; UNIDO: – United Nations Industrial Development Organization; WBG: – World Bank Group; WSSD: – World Summit on Sustainable Development; WWF: – World Wildlife Fund

1. Introduction

This article aims to highlight the role Development Finance Institutions (DFIs) can play in promoting implementation of the Clean Development Mechanism (CDM) in Africa. The approach taken is to demonstrate innovation by a DFI in promoting CDM in Africa and to extract some of the lessons learnt.

The CDM is a new, market-oriented, innovative, and flexible financing instrument articulated by the 1997 Kyoto Protocol that came into force in February 2005. Its purpose is to enhance the implementation of investment strategies for adapting to or mitigating the adverse effects of climate change and promoting sustainable development.[3] The effects of climate change are measured in carbon dioxide (CO_2) equivalent units (1992, United Nations Framework Convention on Climate Change and 1997 Kyoto Protocol) and assigned monetary values for possible exchange and trade. This process of valuing CO_2 equivalent into monetary units is complex for both DFIs and policy-makers (Gowdy and O'hara, 1995).

Despite the complex process, DFIs are willing to promote CDM in Africa with the objective of adding value to development impact (Cocker and Richards, 1992). The value of CO_2 equivalent units are largely generated by development projects – for example, energy produced from coal has high emissions due to high carbon content and can effectively be reduced by the CDM initiative. Other sources of emissions include industry, construction, transport, agriculture, residences and fugitive emissions from fuels including solid fuels, oil and natural gas. Also, improperly managed land-fills produce methane (CH_4). Note that CH_4 has a higher global warming potential than CO_2 but a life span of only about 20 years in the atmosphere while CO_2 lasts up to 100 years, hence a better climate change measure (Karani, 2002). In addition, DFIs can support financing moveable assets utilized in managing waste management. For example efficient trucks required to move waste from source to landfills could contribute to effectiveness in capturing methane gas. Therefore, the CDM's leveraging potential creates an enabling environment for DFI participation.

The evolution of DFIs regarding the CDM as pioneered by the World Bank Carbon Finance Instrument[4] goes back to the establishment of the Bretton Woods Institutions (the World Bank and International Monetary Fund) in the 1940s. The World Bank and IMF evolved as DFIs to assist in financing development that would otherwise be unaffordable to the borrower. Further, evolution and economic and political pressures in the 1960s, led to the emergence of regional DFIs including the African Development Bank, the Latin American Development Bank and the Asian Development Bank. Musasike et al. (2004), in a paper on the role of DFIs and lessons from Southern Africa of best practice for their effective management, argue that sub-regional and national DFIs have emerged and gained prominence with the support of the Bretton Woods institutions.

Regional DFIs have proved useful in public financing but their dependence on continually diminishing Overseas Development Assistance (ODA) and increasing demands for low-interest capital by developing countries constrain their lending ability (Todaro and Smith, 2003). This constitutes one of the major barriers to achieving sustainable development in Africa. With respect to the emergence of the CDM, analysis shows that Africa still lags behind. Although, the World Bank head of Carbon Finance, Odin Knudsen argues that Africa is a priority region for the World Bank's investments and is no longer a least significant region in terms of carbon projects development that require CDM financing.[5] Review of carbon financed projects by the World Bank indicates that in the year 2004 Africa's share

of carbon projects increased to 15% from almost 0% of actual volume of CDM projects with projected purchase of CO_2 emission reduction purchases worth US$85 million (Environmental Finance, September 2005). Promoting CDM in Africa provides an opportunity that will attract foreign investments and enhance the role of DFIs in ensuring that development impact is achieved in a sustainable manner.

In addition foreign investments provide an atmosphere for DFIs to develop partnerships and increase capacity that will effectively mobilize resources necessary for leveraging development through CDM projects. A majority of African countries potential for CDM is in land-use activities that include management of natural resources thus promoting measures for forest management, afforestation and reforestation that sequester CO_2 equivalent by provisions of carbon sinks. However, a few countries such as South Africa, Egypt, Morocco and Tunisia have coal based energy economy and most of their CO_2 emission reductions in CDM projects are likely to be in energy and transport sectors.

As Africa becomes the *centerfold* for CDM projects through DFIs, Lecocq and Capoor (2003) in their paper on the state and trends of the carbon market, point out that there are very small volumes and only a handful of CDM deals associated with development projects in Africa and in the poor countries of Asia. For example, a Moroccan CDM project portfolio of seven out of 25 projects on energy efficiency can only generate 85,000 Certified Emission Reductions (CER) per year (Senhaji, 2004). While the first South African CDM project on Low-Income Housing Energy Upgrade to be registered by the CDM Executive Board on 29th August 2005 can only generate 2.85 CO_2 equivalent tones per household per year over 21 years (South-North Africa, 2005). In addition, UNIDO's identified CDM projects in Senegal, Nigeria, Zimbabwe, Kenya and Zambia can only generate 1.17 million tones of CO_2 equivalent (UNIDO-COP8 Side event October 26th 2002). These indicative total emissions from Africa are almost equivalent of one CDM project in Brazil, Mexico, India, China or Poland. Although emissions in South Africa, Nigeria and Egypt are seemingly higher, Africa, in particular is behind the rest of the world as far as sustainable development is concerned. This is unfortunate, considering that in the period 2000–2003, Africa's overall share of Direct Foreign Investment (DFI) was about 5.6% of the total compared to 4.7% for economies in transition (Lecocq and Capoor, 2003).

However, the CDM process has not in itself made it possible for Africa to move fast enough in attracting foreign investment. This is partly due to the CDM process itself that has been extremely slow and constrained by institutional bureaucratic obstacles. There is little progress within the CDM process that is yielding positive results. Thus far, only 16 CDM projects globally have been registered by the CDM Executive Board out of which 1 is located in Africa specifically at Kuyasa, Khayelitsha, south-eastern side of Cape Town, South Africa.[6] Ideally, this is a typical development project that would obtain funding from DFI. Since the project objectives include development impacts through installation of solar water heaters, insulated ceilings and compact fluorescent lighting bulbs in 2300 households of poor

low-income community. The CDM potential will generate environmental and climate change benefits through reduction of dependence on high pollutant fossil-based energy consumption that will result into reduction of 2.85 CO_2 equivalent tones per household per year.[7]

This project has high potential for replication in other areas with low-income and fits in DFIs' framework for supporting development impact. All the 16 CDM registered projects focus on land-fill gas, renewable energy and small-scale hydro electric power that are not a priority for moving the African economy forward.[8] But, these CDM projects are significant in terms of achieving development impact that is qualitative through improved health benefits related to reduction of respiratory illness correlated to in-door air pollution, reduction in dust emissions and contributions to local capacity development through empowerment, education, equity and gender balance.

Other CDM projects that promote qualitative development impact and not officially registered but can also receive funding from DFIs include UNEP-Risoe capacity development CDM projects in sub-Saharan Africa. These projects focus on building local capacity by working with local experts in Cameroon, Ghana, Mali, Mozambique and Zambia. The capacity will be built through installation of mini-hydro-electric power stations, development and promotion of efficient cooking stoves, development of biomass energy and dissemination of solar water pumps on the basis of renewable energy technology that is less pollutant.[9]

Moving the African economy forward requires bridging the financing gap. Within the CDM framework, additional resources can be made available to bridge this financing gap. However, emergence of sub-regional and national DFIs serves the purpose of bridging this financing gap but CDM additional resources could be complementary. Good examples of sub-regional DFIs include the Development Bank of Southern Africa (DBSA), the East African Development Bank (EADB) and the West African Development Bank. The mandate of these institutions includes provision of basic services in their region with emphasis on building infrastructure that will add value for socio-economic development. Nonetheless, social problems continue as the region is characterized by increases in the incidence and prevalence of HIV and AIDS, unrest (crimes, un-employment), political instability, high inflation, low savings and low investments.

To diversify and mitigate some of the social and investment risks, the national DFIs aim to supplement sub and regional DFIs (Labatt and White, 2002). Because many DFIs are subsidized by governments or overseas grants, the competition among them for finance sources is tight and compels them to be innovative at both entrepreneurial and corporate levels. Innovative processes drive DFIs within CDM framework with ability to blend DFI funds with CDM in an innovative market-based financial instrument. As part of the innovative approaches, some DFIs are self-financing through capital markets while others, in view of supporting sustainable development, are allowed by government to generate additional resources through tax-breaks and non-payment of dividends. The CDM stands very much in support of sustainable development and thus DFIs are well positioned to promote it (Brady,

2005). Since DFIs have both early exposure to development issues and seek financial sustainability, their promotion of the CDM in Africa can:

- Enhance investment in infrastructure;
- Promote partnerships; and,
- Catalyze development of the carbon market in Africa.

The potential for investment in Africa is huge but requires the identification of gaps and establishment of linkages to the CDM. For example, linking transportation infrastructure with urban planning and design, will build communities that provide better quality of life, are not dependent on the private automobile, and allow for easy access to facilities on foot, bicycle or public transport. Other key economic infrastructure opportunities to consider include communication infrastructure that reduces unnecessary travel, and water and sewage treatment that enhances quality of life, reduces poverty and contributes to development. A good example in this case is none or restricted flush toilets, saving large amounts of water and capital intensive infrastructure. Restoration and rehabilitation of damaged ecosystems constitute other CDM opportunities.

2. DFI products and services

DFIs' products and services broadly include development banking and development assistance (Musasike et al., 2004). Musasike and colleagues, among others, specifically categorize DFIs' products and services to include lending and investment; guarantees, grants and technical assistance; advisory services; research and policy. This classification does not detail the new and innovative products based on carbon measured in CO_2 equivalent units as articulated in the CDM. Within the CDM framework an example of a DFI project with CDM potential is the DBSA Bethlehem Hydroelectric Power. This project has been approved by DBSA for partnership with the World Bank and considered suitable for carbon financing. The project is in the process of getting registered by the CDM Executive Board upon which will be officially recognized for carbon monetary exchange. This project has an installation capacity of 4 Mega Watts (MW). DFI products associated with this project are investments worth US$5 million, technical assistance and advisory services. The project will generate climate change benefits worth 200,000 CERs or equivalent of 200,000 tones of CO_2 that will be purchased by the World Bank at a price ranging between US$4–5 per CER. This will generate additional monetary returns of US$800,000 to US$1,000,000.

The project has been validated by internally accredited UK based organization and the analysis indicates that development impact at local level will yield in the long term economic activities resulting from project spill-over effects. Immediate project results will include job creation with absorptive capacity of 40 skilled and 100 unskilled opportunities during construction phase and 3 permanent positions in the implementation period. Other DBSA CDM projects in the pipeline are bio-diesel in

the Zambia likely to create 20,000 jobs and enhance energy security; and an industrial project in Brits area of South Africa considering energy production from waste gas. This project is to be developed in partnership with the World Bank and Industrial Development Corporation (IDC). The project will generate clean energy and improve quality of life considered attributes of development impact.

Since the year 2000, the evolution of CDM with carbon financing is seen as a product that can be offered within the framework of development banking and development assistance. The World Bank Prototype Carbon Fund (Environment Finance, September 2005) has generated lessons and good practices on the application of the CDM within the development framework. However, the World Bank continuously face criticism from outside the Bank in crowding out the private sector and from inside the Bank for being insufficiently integrated with the rest of the Bank's development efforts and operations that aim at promoting development effectiveness (Environmental Finance, September 2005). What is required by other DFIs is to extrapolate from these lessons and practices and develop replication strategies in line with their particular strategic thrusts towards sustainable development.

International DFIs provide African-based DFIs with institutional space to establish creativity and innovation. The African DFIs need to create an enabling environment for forging partnerships since such partnerships would strengthen their efforts in attaining sustainable development. With reference to institutional and reputation risks, partnerships can also leverage CDM opportunities and diversify the risks. Since most of the institutions promoting CDM are international and their participation in environmental and social management issues influences domestic and national legislations.

The Development Bank of Southern Africa (DBSA) with a capitalization of R20 billion (equivalent to US$3.3 billion at an exchange rate of US$1 equal to ZAR6 as of April 2005), was established in 1983 and has more than 20 years accumulated experience in development financing and technical assistance in Southern Africa as well as regional and continental experience in private and public sector financing. The Bank does not get subsidies from government but raises funds from domestic and international capital markets.[10]

In the past 10 years, the Bank has made good progress towards realizing its strategic development vision for South Africa. This has resulted in strong partnerships with municipalities, provincial government and regional institutions, such as the New Partnerships for African Development (NEPAD), as well as the private sector. The Bank has extended basic services to millions of un-served and underserved people, and continuously builds further momentum towards achieving the millennium development and NEPAD goals – and fundamentally towards meeting goals for poverty reduction.[11]

As part of its achievement, DBSA has increased the number of households with access to safe water from 7.2 to 10 million – that is, from 79.8% of the total in 2001 to 85.0% in 2004. The number of households with access to electricity increased from 5.2 to 8.3 million – equivalent to a percentage increase from 57.5 to 70.4%.[12] The Bank aspires to reach the remainder of the households in partnership with the

government of South Africa and other development institutions. This is necessary because the overwhelming majority of the remaining service backlogs are in rural areas where settlement densities are low and costs of electricity and water connections are high. To offset some of these costs, it is necessary to mobilize additional resources to complement development initiatives. Hence, the CDM provides an opportunity to offset these high costs and promote sustainable development that is cost effective.

The past 10 years of democracy in South Africa – and several decades of experience in the region and the rest of Africa – have demonstrated that there are no easy answers to the continent's pressing development challenges. These challenges fundamentally revolve around poverty, inequity and economic dependency. DFIs need to get Africa's economy onto a faster growth path in a systematic and broad-based way that is responsive to the imbalances and geography of poverty to ensure development as articulated by the CDM sustainability criteria. For this to take place the CDM must be aligned with the challenges of the "poor economy". In this context, note must be taken that South Africa's current annual economic growth rate of 2.8% will not achieve government's millennium development goal of halving the unemployment rate of about 28% by year 2014. This applies equally to other African countries whose low incomes and low savings are not conducive to capital formation.

Table I shows how African countries are struggling to sustain their economic growth. Column one of the table indicates that countries such as Zimbabwe, Guinea-Buissau, Sierra Leone and Democratic republic of Congo continuously experience negative growth. While Burundi's economic growth is at zero meaning nothing

TABLE I. Average annual GDP growth between 1995 and 2004.

Little or No growth, Median growth: 1.7%, Range = −2.4 to 2.7%, 31% of African population		Slow growth, Median growth: 3.5%, Range = 0.5–2.0%, 6% of population		Sustainable growth, Media growth: 5.2%, Range = 4.2–10.0%, 35% of population		Oil countries, Median growth: 5.2%, Range = 1.7–23.2%, 29% of population	
Zambia	2.7	Guinea	4.0	Rwanda	10.0	Equatorial Guinea	23.2
Sao Tome and Principe	2.7	Gambia	3.9	Mozambique	8.2	Angola	6.7
Lesotho	2.7	Seychelles	3.5	Uganda	6.5	Sudan	6.2
Madagascar	2.7	Niger	3.5	Mali	6.1	Chad	4.3
South Africa	2.6	Togo	3.4	Cape Verde	6.0	Nigeria	3.1
Cote d'Voire	2.1	Namibia	3.3	Botswana	5.8	Congo	2.8
Central Africa Republic	1.9	Swaziland	3.1	Benin	5.3	Gabon	1.7
Kenya	1.7	Malawi	3.0	Mauritius	5.2		
Eritrea	1.6			Senegal	5.0		
Comoros	1.5			Tanzania	4.8		
Burundi	0.0			Cameroon	4.7		
Zimbabwe	−0.8			Ethiopia	4.6		
Guinea-Bissau	−1.2			Burkina Faso	4.5		
Sierra Leone	−1.8			Ghana	4.3		
Congo, Dem. Rep	−2.4			Mauritania	4.2		

Source: World Bank (2005), Action plan for Africa's development, p. 4.

happens. Some of the African countries indicated in column two of the table experience slow growth while column three indicates those countries that have institutional abilities and human capabilities to effectively utilize resource to sustain economic growth between 4 and 10%.

Surprisingly, countries shown in column four of the table have oil as a major natural resource for potential economic growth but countries like Gabon and Congo experience little growth while Nigeria very slow growth. Some of the challenges to the dwindling economic growth in African countries are alluded to high population growth that enhance over use and miss-use of resources. But in addition, political instability, civil unrest, conflict, immigration and high levels of corruption have emerged as major obstacles to better economic performance in Africa.

The challenges facing economic growth in African countries contribute to the slow pace of capital formation or investment that is a major reason for Africa's tardy economic growth. The current rate of capital formation, about 16% of GDP, is low compared to fast growing developing countries. Since the mid-1970s, the rate of capital formation in rapidly emerging economies such as those of the Asian tigers has been consistently above 25% of GDP. Clearly, to achieve the millennium development goals by 2014, African countries must target capital formation of 25%. This target creates room for innovative financing that blends CDM flexibility with investment opportunities. Therefore, DFIs efforts in bridging financing gap can utilize CDM opportunities to enhance investment flows, technology transfer, additional financing and boost development in Africa.

African countries must debunk the notion that the only constraint to growth and poverty reduction is institutional capacity, as is sometimes suggested. Africa faces serious investment and savings constraints, as well as institutional capacity constraints. It is for this reason that African governments must create conducive investment environments by stepping up construction of infrastructure and building institutional and human capital. It has always been clear that socio-economic development and transformation cannot be left solely to the private sector as some ideologies suggest. National, provincial and local government and other public institutions such as state owned enterprises have a key role to play in promoting growth and development that makes use of CDM resources in partnership with DFIs.

And indeed this is where DFIs such as the DBSA play an important part. It is for this reason that the DBSA is keen to work with municipalities and provinces to boost such investment, not only through its financing role, but also through its advisory and partnership roles. Notwithstanding the specialized role of certain DFIs, the reality is that neither the public nor the private sector can independently tackle the complex problems of poverty; and neither sector can independently finance the investment requirements of the economic growth and development agenda. A partnership approach, therefore, remains as important as ever. While the DBSA seeks to crowd the private sector into infrastructure financing through public–private partnerships (PPP), this does not amount to it being a financier of last resort. The DBSA tries to fill financial gaps arising not only from un-developed but also from under-developed

capital markets and financial systems. This means addressing the imperfections and weaknesses in capital markets that DFIs experience on a daily basis.

These market imperfections can be described as follows:

- Firstly, private capital can be reluctant to bear the risks – either fully or partly – of providing capital to poor clients that are not considered credit worthy.
- Secondly, capital markets can be inefficient, rendering finance expensive if not inaccessible. This raises opportunity costs and renders some high impact development projects unfeasible.
- Thirdly, in the absence of competitive capital markets, financing costs can be high due to high-risk perceptions, especially when the financier's objective is to maximize the risk adjusted rate of return in the context of an uncompetitive financing market.
- To summarize, without competition, there are insufficient incentives for efficiency, innovation and better value propositions in infrastructure funding.

The issue of access to and affordability of finance in South Africa and the rest of Africa is highly topical, especially in the wake of a landmark study on the banking sector in South Africa.[13] The study confirmed that some 50% of South Africans are unbanked, and that small and medium enterprises battle with little success to get access to finance. It also revealed that, in comparison to other African countries, the South African banking sector is highly profitable. The sector makes unusually high profits, more so than virtually all other competitive sectors when taking risk into account. On an inflationary adjusted basis, the average return on assets of the South African banking sector was almost double that of the top 100 international banks listed in *The Banker* magazine. The study raised questions about the extent to which the banking sector is competitive. This is not surprising considering the industry's concentration with five big banks accounting for close to 80% of the financial market.

The task of the DBSA is to identify risks and maximize opportunities for development through a high quality portfolio of investments. With the emergence of the CDM, the bank has the potential to mitigate adverse effects (on human health, water quality, soil fertility, climate change, and so on), to enhance efficiency and cost-effectiveness in both the mobilization and use of resources and to protect the environment to add value to sustainable socio-economic development. Unlike other DFIs in South Africa, including the Land Bank established in 1912, the Industrial Development Corporation (IDC)[14] established in 1940, the National Housing Corporation established in 1996, the Khula Enterprise Agency of the Department of Trade and Industry established in 1996, the National Empowerment Fund created in 1998, and the National Development Agency established in 2000, the DBSA has emerged as a knowledge-based DFI and a key change agent for socio-economic development. As a self-financing DFI which is not dependent on government subsidies, DBSA's strategic thrusts embrace financing, partnership and advisory services, each of which has clear functions as indicated in Table II provide an opportunity for promoting CDM in Africa.

TABLE II. DBSA strategic thrust.

Financier	Partner	Advisor
Fund Mobilizer	Catalyst	Policy analysis
Grand maker	Leverage	Advocacy
Lender	Agent	Capacity building and training
Investor	Development facilitation	Research and Evaluation
Under-writer		Development information
Arranger		

Source: Jackson (September 2004), in DBSA Knowledge Management Annual Report.

Table II shows how DBSA as an emerging DFI can promote CDM in Africa through financing that include mobilizing funds, making grants and investing in CDM projects. For example, the Bethlehem CDM project will receive US$5 million in financing from DBSA. Through partnership arrangements the project will generate 200,000 worth of CRE to be purchased by the World Bank at a price of US$4–5 per CER. The DBSA team is proving advice and technical assistance to the project design team and facilitating discussions with the government to register the project with the CDM executive Board through the Designated National Entity (DNA) housed by the South Africa Department of Minerals and Energy. In part, the role of DBSA as a financier, partner and advisor is in effect enhancing compliance to the best practices of CDM project cycle and criteria for sustainable development.

DBSA's products and services as shown in Table III give some indication of how the CDM could be leveraged and promoted through lending and investment products. Selecting infrastructure with CDM potential in South Africa, Lesotho, Mozambique and Mauritius, indicates that CDM could leverage up to US$300 million worth of investment in these four African countries. Investors in infrastructure in Africa recognize their environmental and social responsibilities and obligations. This recognition creates room for promoting the CDM through DFIs' products and services that are market-based. For a long time DFIs' financing was not market-based in approach and experienced market exploitation due to lack of project design that was not market-based.

The lending and investment activities indicate a challenge to DFIs such as DBSA on ensuring delivery of services and products efficiently. One way of meeting this challenge is to combine CDM projects with normal Bank operations as indicated in

TABLE III. DBSA lending and investment activities.

	Sector	Country	Amounts (R'm)	Amounts (US$)
City of Johannesburg	Sanitation	South Africa	R1318.7	$196.8
Toll road N4	Transport	South Africa	R200.0	$29.9
Lesotho Highlands Dam	Water	Lesotho	R380.4	$58.8
Sasol	Energy	South Africa/Mozambique	R650.0	$97.0
Mauritius Central Energy Board	Energy	Mauritius	R251.3	$37.5
Mozal	Commercial	Mozambique	R545.8	$81.5
Emerging Africa Infrastructure	SME	Multi-country	R2043.5	$305.0

Source: Jackson (September 2004), in DBSA Knowledge Management Annual Report.

Table III. The comparative advantage of doing so is to integrate all project preparation costs and all the work being done on environmental impact assessment, social impact assessments and safeguards that are included on a market-based approach. This approach will reduce transactions costs and diversify risks that are likely to impact the CDM projects and limit development in Africa. In this context CDM resources will leverage normal DFIs' funds for investment.

The projects listed in Table III are purely Bank operations with limited market-based innovative financing. These projects require environmental assessments through procedures and guidelines to determine their likely impacts. In most cases, the assessment reflects on the bigger-issues in terms of size of the project and likely damage to the environment in particular effects of pollution, depletion of biodiversity and displacement of people. But, the most critical indirect effects on human health and climate change are likely not to be captured through traditional DFI operations. Therefore, integrated approach that promotes CDM market-based innovative approach through traditional bank operations will enhance both quantitative and qualitative measures that capture indirect effects of developmental projects blended with CDM investments.

The products offered by the DBSA are sector specific and can contain components for carbon products. In particular, energy and transport as well as waste management shown in Table III provide a strong base for promoting the CDM through the DBSA as an instrumental DFI. In addition to its products, the DBSA provides services through technical assistance and portfolio management across countries and sectors as shown in Figure 1. Effective and efficient provision of services is necessary for reducing transaction costs and relevant to the promotion of the CDM as key players in development opt for reduced transaction costs.

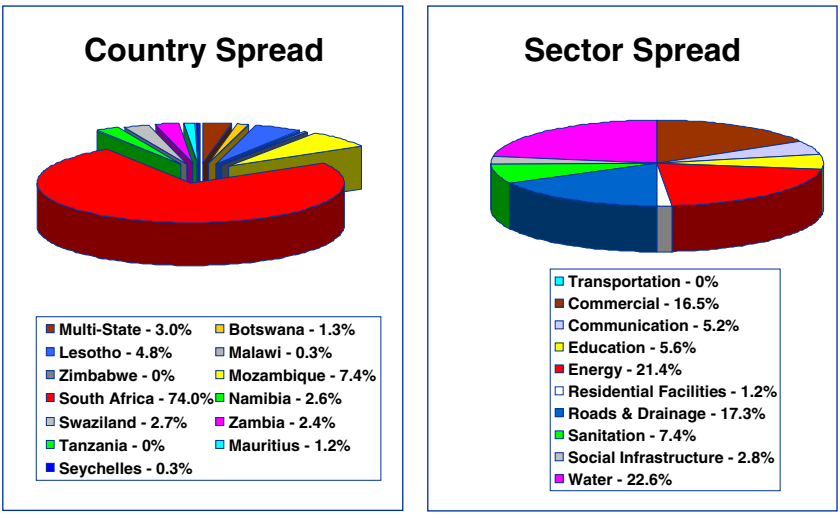

Figure 1. DBSA loan portfolio management. Source: Barry Jackson, September 2004, in DBSA Knowledge Management Report.

The DBSA loan portfolio management gives an indicative that South Africa has a larger share of the investment than other African countries. Therefore, the role of DBSA as a DFI aiming at promoting CDM in Africa will have to balance investment in Africa by diversification on country by country basis approach. Although, in terms of prioritization, DBSA is likely to finance South Africa that contains 74% of its investment portfolio while Zimbabwe and Tanzania with 0% of DBSA investment are likely to be least in priority since the risks could be too high and initiation costs of CDM projects could be higher than South Africa where DBSA has more presence and comparative advantage. In terms of sector specific, energy (21%), roads and drainage (17.3%), sanitation (7%) and water (22.6%) are likely to get initial CDM attention. What this means as shown in Figure 1 is that areas with potential in land-use projects such as forestry and agriculture will not be a priority at the present time. This is contradictory to promoting CDM in Africa through DFIs whose primary purpose is to contribute to development in less fortunate economies.

High transaction costs are barriers to promoting the CDM, particularly in Africa where market innovation is slow and constrained by institutional and administrative constraints. As indicated in Figure 1, transaction costs can be incurred and increased through poor portfolio management. Country or sector specific portfolio management has variable costs that impact directly or indirectly on transactions. Figure 2 indicates DBSA operations that are divided into three market segments

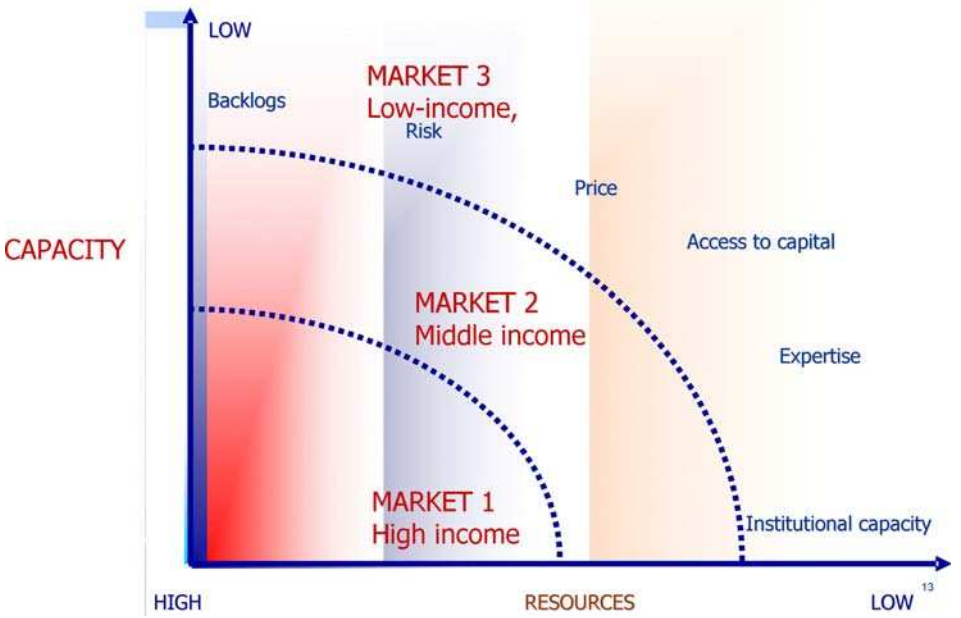

Figure 2. Market segmentation. Source: Barry Jackson, September 2004, in DBSA Knowledge Management Report.

with the risk factor to investments increasing from type 1 market to type 3 markets. Type 1 and type 2 markets have adequate capacities and sufficiently well structured institutions to promote the CDM and lessen transaction costs. But type 3 markets have numerous problems including low incomes, high poverty rates and lack of institutional capacity that make transaction costs for the CDM very high since, the local economy is sluggish and access to capital is difficult due to high risks, low savings and inadequate capacities.

Figure 2 shows that type 3 market is the most suited for CDM within the anticipated criteria of promoting sustainable development. As shown in Figure 2, this type of market experiences severe backlogs in delivery of basic services such as water, food, education, access to financing among others. Also, this market experiences high risks that make it difficult to attract investments and continuous instability in prices also signals stagnation in economic growth, inadequate expertise and institutional inabilities necessary to promote sustainable development.

As part of addressing sustainable development, the DBSA supports infrastructure development in market 3 and identifies and then manages or mitigates high risks. Because of this bold approach to investment, it is imperative for the DBSA as a DFI to promote the CDM instrument as it is market oriented and enhances innovation for sustainable development. Figure 3 provides a scenario of the current situation that makes it possible to integrate the CDM into DBSA operations in South Africa and other countries in Africa. Apart from South Africa that has three market segmentations as discussed above, a majority of African countries operate in a market type three compounded with high risks, low savings and poor infrastructure and highly indebted. South African market thrives on three fronts of type one market (M1) that experiences low-risk, sufficient savings and high potential to attract

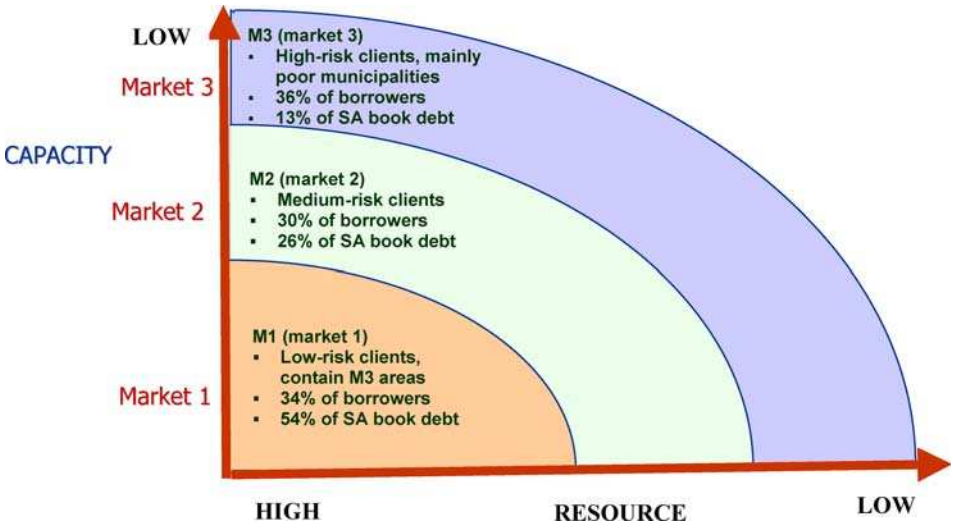

Figure 3. Market focused on South Africa. Source: Barry Jackson, September 2004, in DBSA Knowledge Management Report.

investments and in most cases can get funding directly from commercial ventures other than development funds.

Market two (M2) experiences medium risks, medium debt and can to some extent attract investments with the support and participation of partnerships that can mitigate or divert some of the risks. Market three (M3) has lot of difficulties ranging from institutional inabilities, inadequate technical capabilities and high risks that make it un-conducive for investments. This type of market requires a lot of capacity building and funds that are not loans but grants that will re-fuel the economy. Therefore, CDM provides the opportunity for this type of market in South Africa and African countries to be assisted through DFIs that have ability to diversify or mitigate investment risks, mobilize and leverage resources towards achieving sustainable development.

Environmentally sound Infrastructure is strategic for the DBSA's involvement in socio-economic development through investment, advisory services and partnership. As DBSA's primary focus is on financing infrastructure and sustainable development (its mandate), its basic point of departure is that the environment is the source of development and that its protection and conservation require full support. This is in accordance with its mandate under Section 5 on principles for support and in particular Section 5 (4.6) that refers to leveraging development projects to achieve environmental sustainability in association with financing infrastructure as described in Sections 6, 6 (6.1–6.3) respectively. In addition, guidelines and environmental policy at the DBSA (February 2001 and November 2005) cover approaches on how to appraise the environmental impact of projects, how compliance with environmental legislation can be ensured and how conditions for the Bank in financing environmentally sensitive projects can be applied appropriately.

Complying with its environmental appraisal guidelines in relation to its vision 2014 (Strategic Guidance on Smart Partnerships), requires strategic institutional realignment on the part of the Bank to perceive the environment as a cross-cutting issue in strategic sectors. These include supply of clean water, and where unavoidable, treatment of waste-water, mitigation of sewer overflows, improvement in efficient transport systems, increased development of clean energy sources, abatement of traffic air pollution and industrial discharge, reduced consumption of toxic chemicals and improved agricultural productivity, improved management of ecosystems, biological diversity, natural resource management for sustainable tourism and economic development, marine support systems and mitigation of climate change through development of carbon credits and participation in carbon markets within the framework of the CDM as stipulated in the 1997 Kyoto Protocol and the 1992 UN Framework Convention on Climate Change (UNFCCC).

The market for clean design, clean production, sustainable and appropriate packaging, community-based resource recovery, and adding value to existing safe water streams exists with numerous challenges. Valuing CO_2 and measuring development impacts at household levels are not only monetary in approach but challenged by policy responses.[15] Global warming and climate change have become issues that require policy responses and financial commitment. Taking South Africa as an example, it is recognized as one of the top 10 countries in the world for high

emissions of greenhouse gases estimated at 1.6% in 1999. High emissions of greenhouse gases in South Africa are associated with power generation dependent on combustion of coal and the transport sector. More than 90% of South Africa's electricity is generated from coal and contains approximately 1.2% sulphur and about 45% ash. Air pollution has a significant impact on the environment and on health as it increases marginal social costs and limits financing the development of infrastructure. It is estimated that about 2000 children die every year as a result of respiratory problems caused by air pollution (IQPC 2004). In addition, Eberhard and Pegram (1999) in economic assessment paper estimate that the total cost of water borne diseases in South Africa, particularly diarrhea, is R3.5 billion per year. In response to mitigating these adverse effects, South African environmental legislation is embedded in the constitution and further developed in the National Environmental Management Act (No. 107, 1998) and a host of another legislation that is curtailed by administrative and institutional constraints.

Environmentally friendly infrastructure requires investment in products, processes and services that are not polluting or harmful to human health. Investment by the DBSA in pollution prevention technologies through CDM initiatives will result in minimizing costs that, in the long run, would be greater than the initial investment. Clearly, the DBSA must assist clients and partners in the planning, design and construction of environmentally friendly infrastructure that is cost-effective, efficient and sustainable. What is important for environmentally friendly infrastructure is the quality of services and products offered by the DBSA. Consequently, it is important to identify and assess potential natural and human induced environmental hazards and risks within the context of CDM investments (Meyer, 2004).

The DBSA needs to note that extremely high investment costs are associated with environmental problems ranging from public health impacts to natural disasters. Environmental problems present a particular challenge to policy makers, as their causes and manifestation occur at local, regional and global levels. Also, environmental policy making requires coordinated efforts between social, ecological and economic institutions. As a result, many DFIs including the World Bank, European Bank for Reconstruction and Development, African Development Bank, Asian Development Bank, Latin American Development Bank among others, are responding positively to environmental challenges and the emerging environmental markets within the CDM framework. Subject to their financing frameworks at local, regional and international levels, they have begun financing environmentally friendly infrastructure through their sustainable development programmes.

Part of mainstreaming and integrating environmental issues in infrastructure for sustainable development, requires strengthened policy and financial incentives without neglecting appropriate and enforceable quality standards for the various receiving media. Incentives must be supported by institutional commitment and strategic response to both internal and external demands for improving the soundness of the environment so that value is added to socio-economic development.

3. The clean development mechanism

The CDM is one of the flexible mechanisms established by the Kyoto Protocol to promote reduction of greenhouse gas emissions in a cost-effective manner. In addition to the other flexible mechanisms, Emissions Trading and Joint Implementation, rules and modalities for the CDM have been discussed at a variety of meetings including the 1997 Kyoto Protocol, 1998 Buenos Aires Plan of Action, and 2001 Marrakesh Accord in Morocco. In these meetings, participants agreed to promote the CDM in the context of sustainable development that would include small scale project activities and land use, land use change and forestry (LULUCF) projects in addition to energy, waste management and industrial projects.

The practical application of the CDM is to provide opportunities and solutions for mitigation of climate change and to contribute to sustainable development and technology innovation, deployment and diffusion as well as capacity building. The 2002 Johannesburg World Summit on Sustainable Development (WSSD) supplemented the United Nations (2000) and UNICEF (1998) efforts towards promoting sustainable development. To underline the importance of these efforts, the WSSD indicated that 1.1 billion people world wide lack access to safe and clean drinking water and 2.9 billion people lack access to adequate sanitation while over 70% of the world's six billion people live in areas with no access to electricity and efficient transport systems. Some 21% of urban people globally lack access to safe water and 27% lack adequate sanitation. DFIs provide financing to address sustainable development issues; more finance is necessary and the CDM provides additional financing opportunities through carbon products or credits with potential for leveraging development impact.

4. Carbon credits

Development of carbon credits can be complex and requires exchanging information and sharing knowledge and experiences. Based on DFIs' long history and experience with providing finance and technical assistance for effective development, practical opportunities and solutions to promote the CDM through DFIs cannot take place without entrepreneurship. Whether in process or product innovation, entrepreneurship must be viewed in the context of:

- Factors that promote the CDM through mitigating technology innovation, deployment and diffusion, including national, regional and international cooperative efforts and removal of barriers to sustainable development; and,
- The socio-economic aspects of mitigating climate change, such as costs and benefits, co-benefits, poverty reduction, and economic impacts, including spillover effects.

Entrepreneurship is a key factor in promoting the CDM through DFIs and will facilitate positive thinking about the mechanism in the context of sustainable

development in Africa. Table IV shows how entrepreneurship enacted through economic sectors with DFI financing can generate carbon credits. The carbon credits calculated in CO_2 equivalents can be generated by sectors through accelerated technologies and efficient and cost effective practices that are entrepreneurial in nature as indicated in Table IV.

Thinking about the CDM from a DFI point of view, requires a strategic approach aimed at promoting sustainable development as mandated by CDM criteria. Development in most emerging economies is driven by low cost options unattractive to investment as they are often linked to the consumption of low quality fuels deemed polluting. To mitigate such pollutants requires rationalization of development financing. This is in accordance with emerging environmental markets, particularly the carbon market that innovatively promotes additional financing for environmentally friendly initiatives aimed at reducing emissions of greenhouse gases such as CO_2 and CH_4 among others. Table IV indicates CDM potential projects likely to generate carbon credits and associated products and services necessary to promote sustainable development within the mandate of DFIs.

In the context of the new emerging environmental markets, carbon credits provide an opportunity for innovative investment opportunities through payment for environmental services and products. Thus far, a major focus in carbon credits is linked to the 1997 Kyoto Protocol directive, which allows industry to meet its emission reduction commitments through Kyoto's flexibility mechanisms, namely the CDM and Joint Implementation (JI). There is extensive discussion on sourcing CDM and JI carbon credits for compliance with the sustainable development criteria, suggesting that the market for CDM projects and credits could finally take-off with the implementation of the Kyoto Protocol in February 2005. This provides an opportunity for investment in environmentally sound technologies, particularly renewable energy technologies (RETs).

Acceleration of environmentally sound technologies through additional investments can generate carbon credits. At the moment, the DBSA is operating in Market 3 where investment for poverty reduction is driven by policy and business continues as usual. In this type of situation, low-cost options are preferred by clients – hence the tendency towards using polluting technologies because of a perceived short-term cost advantage. At this level of operation, very small volumes of carbon credits can be generated. Since environmentally sound technologies are sometimes high cost initially and carbon credits are market driven, the CDM and environmental financing provide additional resources to supplement investment for carbon credits. This approach encourages investment in low carbon economies - for example, investment in renewable energies that are non-polluting and enhancement of carbon sinks and sequestration projects. This level of operation has potential for generating carbon credits at an additional cost that is out-sourced above DBSA's investment baseline. Therefore, the challenge for the DBSA to operate effectively in the carbon market is to be able to internalize the externalities in investment activities and promote environmentally sound technologies.

TABLE IV. Sustainable development and CDM.

Thinking about sustainable development and CDM with associated products and services can be promoted by DFIs through financing specific sectors as indicated below		
Projects	Carbon credits	Products and or services
Energy efficiency and conservation	CO_2 or equivalent	Energy efficient technologies and conservation practices for lighting, heating, ventilation, air conditioning, food-service appliances and office equipment.
Water efficiency and conservation	Carbon Sequestration or CO_2 equivalent	Water efficient technologies and conservation practices for food services and equipment, and landscaping
Recycling and composting	CH_4 or CO_2 equivalent	Recycling services for many waste products such as glass, plastic, metals, mixed paper, grease, ink and toner cartridges. Food waste that can be diverted from other waste and made into nutrient-rich soil through the use of composting or on-site recycling.
Sustainable agriculture	Carbon Sequestration or CO_2 equivalent	Sustainable agriculture that supports the long term maintenance of ecosystems and agriculture for future generations. Promotion of organic agriculture that prohibits the use of toxic pesticides and fertilizers, irradiation, sewage sludge, and genetic engineering. Organically grown foods reduce the amount of pollution associated with the transportation of the fertilizers. Plant based foods require fewer natural resources and create less polluting calorific values consumed.
Pollution prevention	CO_2 equivalent	Pollution prevention is achieved through avoidance, good design, source reduction, reuse, or improving practices.
Recycled, tree-free, biodegradable and organic products	Carbon Sequestration or CO_2 equivalent	Recycled products are made from materials that are collected from post-consumption industrial waste sources. Tree-free products that are made from alternative plants such as hemp or kenaf. Biodegradable products capable of being decomposed by agents, especially bacteria. Organic products that are grown without the use of toxic pesticides and fertilizers, irradiation, sewage sludge. And genetic engineering.
Chlorine free paper products	CO_2 equivalent	Chlorine-free paper products are unbleached or whitened with alternative solutions such as hydrogen peroxide, oxygen, and ozone.

Non-toxic cleaning & chemical products	CO_2 equivalent	Non-toxic cleaning and chemical products are biodegradable, non- hazardous and safe for people, animals and the environment when used properly.
Green power	CO_2 equivalent	Electricity and power are available from renewable resources such as wave, tidal, wind, solar PV, solar thermal (bulk and small scale), geothermal, small hydro and biomass. These energy sources cause no pollution and zero damage to the environment when compared to fossil fuel, nuclear and large scale hydro.
Green building and construction	CO_2 equivalent	Green design and construction practices significantly reduce or eliminate the impact of buildings on the environment, occupants and the local community.
Biomass	CO_2 sequestration	Forest rehabilitation. Community natural resource management initiatives
Environmental awareness	Knowledge based Market Place	Building necessary capacity through education, training, advisory services that enhance management of the ecosystem and contribute to the protection of the environment, ideally by developing systems that design out the negative impacts at source.

Thus far, DBSA is already experimenting with carbon credit mechanisms through a collaborative agreement with the World Bank Prototype Carbon Fund. Some projects have been specifically developed for this purpose and a few others are in the pipeline. As mentioned earlier, the South African Bethlehem Hydroelectric power, the Zambia bio-diesel and the Brits waste to power CDM projects are classical examples that would show case the potential of DBSA as a DFI that has ability to promote CDM for sustainable development in South Africa and other African countries. The CDM resources will leverage the DBSA financing and make it possible to deliver on CDM projects in countries and markets that experience high risks, low savings and low investments. Carbon financing is emerging as an innovative instrument with potential for enhancing sustainable development. The financing supports clean and low carbon energy economies, carbon sequestration through natural resource management, biodiversity conservation, land use and land use change and forestry (LULUCF).

5. Classifications for removal of barriers to CDM

In beginning to recognize the value added to DFIs by promoting the CDM, it is important to note that all DFI financed projects identify and classify environmental problems. Classification systems could be modified to use the following common categories:

- Pollution,
- Resource depletion and extinction,
- Resource preservation and restoration, and
- Equity and poverty eradication.

Such classification would prompt DFIs to view the environment as a provider of services to society which include sustained production of goods consumed by people, as a source of recreational activities, moderating the climate and cultural values. Innovation in DFIs revolving around knowledge creation could move them towards solutions that seek the eradication of poverty linked to development of environmentally sound infrastructure.

Scope and location of projects are key considerations for DFI financing. In this context, CDM projects vary a great deal. For example, cases of pesticide contamination, industrial pollution or soil erosion can be dealt with at local or regional level, while issues of biodiversity preservation or carbon sequestration are trans-boundary in nature and may require regional and international interventions.

6. DFI potential in promoting CDM

A number of environmental standards have been emphasized and legitimized by the Equator Principles and the World Bank and IFC environmental guidelines and

safeguard measures and policies. DFIs needing to internalize the Equator Principles and safeguard measures on environmental and social issues provide a potential opportunity for promoting the CDM. For instance, the Equator Principles seek to ensure that projects are developed in a manner that is socially responsible and reflects sound environmental management practices. DFIs need to mainstream environmental matters if they are to comply with these principles, and the World Bank Group's environmental guidelines and safeguards.

"*The equator principles aim to ensure that financiers play a more substantial role in promoting sound environmental management and responsible social development. Projects are classified as high, medium or low risk (as acknowledged in DFI's Environmental Guidelines), with the former two requiring thorough environmental assessment reports that address the interests of a wide range of parties that may be affected. An environmental management plan has to be prepared to ensure environmentally and socially responsible practices will endure for the life of the project, and beyond. These must be implemented together with the relevant IFC guidelines and safeguard policies*".

In brief, the Equator Principles are part of the financial services sector's response to the growing demand that it recognizes the role that it can, and should, play in achieving sustainable development as indicated by the CDM criteria. Although the sector has traditionally seen itself as clean, financing decisions tend to determine which projects obtain funding to proceed and affect development choices. Further, in the consumption of services, the sector is a major contributor to waste streams, toxic environments and uses large quantities of water and energy, both directly and indirectly through paper and other materials used in-house. The other motivation to subscribe to these principles is risk reduction, which in turn has direct bottom line implications. As the liability of investment grows, environmental and social issues can no longer be regarded as soft issues. Zero waste principles could also assist in designing risks and are a good yardstick for ensuring automatic compliance with legislation and regulations – the International Standards Organization (ISO) 14001 among others.

The most obvious benefit of the Equator Principles to DFIs is that they would be more committed and responsible and ensure that projects are subject to greater scrutiny, which should result in them being more environmentally and socially sound. Beyond that, the principles also offer consistency necessary for compliance and minimizing institutional risk. The principles provide for commonality in approach and terminology among all subscribing DFIs, which should provide certainty for both the DFIs in respect of project risk and the customers or borrowers who have a prescribed framework with which they must comply if they are to obtain funding.

The Equator Principles also create peer and consumer pressure on other financial institutions. Local banks in emerging markets such as the DBSA will need to markedly improve their environmental and social risk practices if they wish to be considered to partner with subscribing DFIs in large projects where the principles exceed DBSA guidelines. Such partnerships offer a great opportunity for knowledge transfer of best practice to local DFIs that are involved in these projects. Local DFIs are also likely to find it difficult to win tender proposals and collaborate with the

World Bank and IFC since they are pioneering the CDM, the Equator Principles and safeguard policies on environment and social matters. Tenders and collaboration will be very competitive against DFIs that subscribe to the stricter and more consistent environmental and social standards.

In the context of emerging CDM markets that are environmentally based, Sterner (1999) in the market of environment argues that it is necessary to promote market based policy instruments for institutional transformation and reform of the environmental agenda that will promote CDM initiatives. The policy reform and institutional transformation is critical to effectiveness of the DFIs that will be competent to promote CDM in Africa with strategic targets for financing environmental infrastructure as indicated in Figure 4. Figure 4 is modified from the 2004 Johannesburg plan of action as a follow-up to the 2002 World Summit on Sustainable Development, characterizes sectors in association with institutional arrangements in the South African context and identifies specific areas of policy reforms in governance, economic growth, development and environment that are critical to sustainable development. Therefore, fully require the role of DFIs in mobilizing

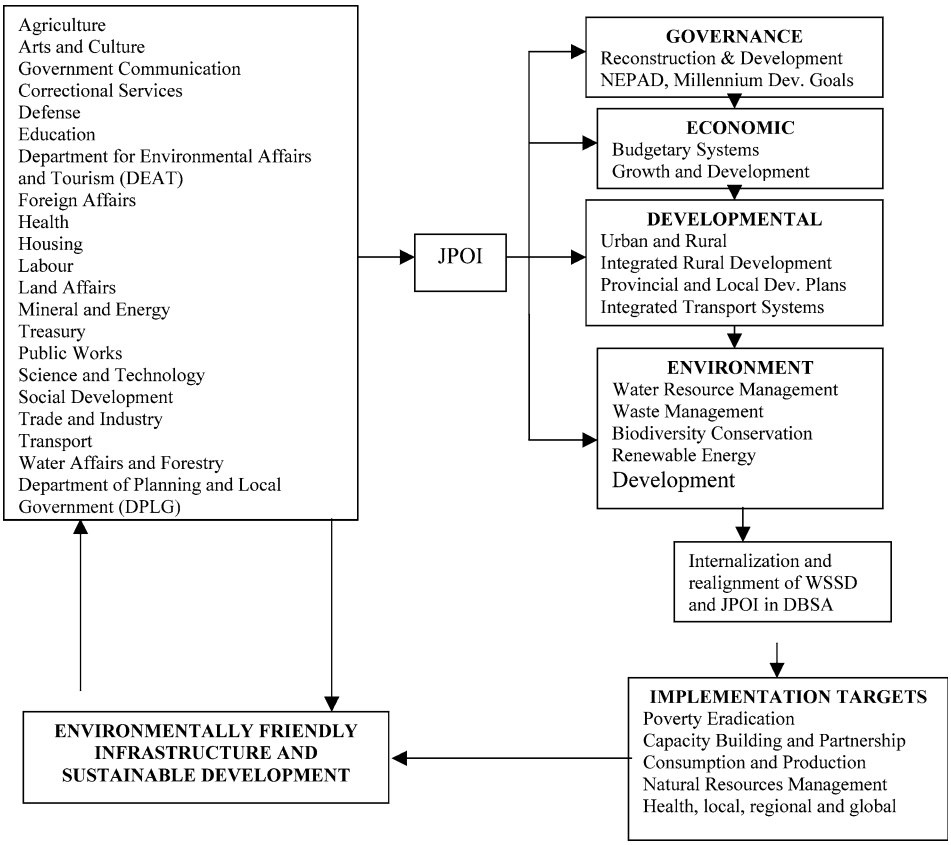

Figure 4. Strategic targets for environmental infrastructure. Source: Modified from Jo-burg + 2 People, Planet and Prosperity delegate Sourcebook, 1–3 September 2004.

resources and providing resources that would achieve sustainable development. It is within this framework that DFIs can promote CDM projects as implementation targets focus on poverty reduction, capacity building and partnerships, economic growth, environmental management and adding value to socio-economic development.

In the specifically South African situation, DFIs can promote the CDM through investment, partnership and technical assistance with the help of the Johannesburg Plan of Implementation that strategically identified key partners and potential areas for environmentally friendly infrastructure development as indicated in Figure 4.

7. Conclusions

Over the years, DFIs have gone through institutional transformations and policy changes with the view of enhancing sustainable development. One of the key criteria of the CDM is promoting sustainable development through additional financing and innovative market oriented processes and products. The complexity of integrating the CDM with sustainable development requires innovation and entrepreneurship. This can be done by DFIs which have a strong commitment to entrepreneurship and accept high risks in part of promoting sustainable development through CDM favourable to poor economies. A majority of African countries experience poor economies and disparately need investment flows, technology transfer, additional financing, knowledge and information resources in-order to boos sustainable development. It is evident from emerging CDM market that DFIs can play a role in promoting CDM activities towards achieving African sustainable development needs.

DFIs' products and services discussed in this article include investments, grants, partnerships, technical assistance and lessons generated based on knowledge and practical development experience. Therefore, CDM as an innovative market-based mechanism driven by sustainable development criteria with potential for generating additional financial resources is suited for promoting sustainable development that is the core business of DFIs. Since a majority of African countries experience little or slow economic growth and development as a result of low savings, high political, institutional, financial and investments risks, CDM could mitigate some of these risks and re-fuel African economic growth through enhanced foreign direct investments and additional resource flows.

DFIs such as DBSA could revamp their current investment and lending portfolios and integrate CDM in their internal operations and scale up their development funding. In addition, DBSA among other DFIs should engage private sectors, the public and civil societies through development of partnerships with the aim of mobilizing resources needed to support sustainable development in Africa. Capacity development is critical to African development and DFIs should continuously provide technical assistance in form of grants and advisory services through knowledge products and services to African countries in order to bridge the gaps in

knowledge, information and institutional space that will enhance the ability and capability to identify and address risks likely to constraint DFIs from promoting CDM in Africa.

Financial risks are prevalent in African countries where savings are low and hence raising capital from domestic markets is difficult. To some extent, poor infrastructure and weak investment flows lead to high transaction costs. In general, this limits potential for reduction of emissions. But DFIs' ability to integrate CDM project and transaction costs into normal bank operations provides an opportunity for promoting CDM activities in Africa. However, return on investments may take much longer and are not guaranteed due to political sensitivities and institutional instabilities. Some of these risks can be managed or leveraged through partnerships developed by DFI for the purpose of promoting CDM in Africa.

8. Recommendations

For DFIs to effectively promote the CDM in Africa through financing sustainable development, the following recommendations need to be considered:

- Identification of the risks and maximization of opportunities associated with CDM financing of sustainable development;
- DFIs commitment to integrating the CDM into sustainable development modules;
- DFIs promotion of entrepreneurship at all levels, encouraging the development of partnerships and promoting efficient and cost-effective approaches to sustainable development.

Acknowledgements

This article has been written as a collaborative effort with institutional support of Development Bank of Southern Africa (DBSA) and BEA International that have been the source of data and information utilized for analysis, conclusion and recommendations. First and foremost, we acknowledge the probing questions and challenges facing DFIs in promoting sustainable development in Africa and aspire to contribute to knowledge and debate through emerging market-based innovative framework referred to as the Clean Development Mechanism (CDM) that has potential for promoting sustainable development.We acknowledge the support of Snowy Khoza, DBSA, Executive Manager, Knowledge Management Division for her encouragement, intellectual guidance and leadership that provided intellectual space and challenges in generating insights that would contribute to global leadership in support of relevant debate towards achieving sustainable development in Africa. Also, we express our thanks to Priscilla de Gasparis, Social Scientist and Specialist at DBSA for her critical and insightful review of the earlier draft of the manuscript. Her candid feedback on the manuscript broadened our own disciplinary perspective and challenged us to clarify and simplify familiar concepts.Special thanks to the journal independent reviewers whose professional

experience and work in the field of environment, development and sustainability challenged our attempt to combine theory and practice in a simple but technical way in addressing a new field of emerging carbon and environmental markets and their potential to benefiting African countries from a complex theoretical innovative market-based point of view and potential practical applications to sustainable development through Development Finance Institutions (DFIs). The reviewers' comments enabled us to simplify a complex technical subject into a simple practical case that makes use of practical examples relevant to African needs for sustainable development.We therefore, have been able to advance the idea of combining theory and practice in the context of advocating for DFIs' institutional abilities and capabilities in promoting CDM for sustainable development in Africa in the broader intellectual dialogue necessary to understanding the complexity of environment, development and sustainability challenges. And last but not least, special thanks are due to our families for their moral support, encouragement and inspiration that led to the writing and completion of this article that generates insights for public debate and possible actions towards achieving sustainable development in Africa.

Notes

[1] Development Finance Institutions provide funding for infrastructure development and poverty reduction and are perceived as agents of change in relation to institutional transformation, policy modification, and environmental and social responsibility.

[2] CDM is one of the flexible innovative financial mechanisms that promote sustainable development from a market-based approach as articulated in the 1997 Kyoto Protocol that came into force in February 2005 in accordance with the 1992 United Nations Framework Convention on Climate Change (UNFCCC). The other flexible mechanisms are the Joint Implementation (JI) targeting large scale reduction of emissions in Economies in Transition in Eastern European region and the Emissions Trading (ET) mechanism that promotes carbon market stock exchange similar to the Chicago sulphur Dioxide stock exchange market.

[3] It should be noted at this point that fundamental challenges DFIs are likely to face while promoting CDM in Africa with specific reference to climate change projects are associated with environmental risks limited to DFIs financial products and services.

[4] New World Bank Carbon Funds include the Community development Carbon Fund for Small projects, and the BioCarbon Fund for carbon sequestration or sinks projects. www.worldbank.org

[5] Quote from *Environmental Finance Journal* September 2005, article on Carbon Finance Focus on Africa, p. 15.

[6] Details provided under CDM project activities at http://Projects/registered.html

[7] Additional information on the project is available at http://cdm.unfccc.int/projects/DNV-CUK1121165382.34/view.html

[8] See an article on Beyond Kyoto Some Thoughts on the past, present and Future by Richard Sandor in the Environmental Finance of September 2005.

[9] UNEP-Risoe Programme Information Sheet, November 2005, "Using Carbon Financing to Promote Sustainable Energy Services in Africa".

[10] The Role of Development Finance Institutions: Lessons from Southern Africa of best practices for their effective management, by Musasike et al. (2004).

[11] This point is articulated by Rashid (2003), Hassan article on Economy-wide benefits from water-intensive industries in South Africa quasi-input–output analysis of contribution of irrigation agriculture and cultivated plantations in the Crocodile River Catchment, in a *DBSA, Development Southern Africa Journal* **20**(2), June 2003, p. 171.

[12] Dinner address by Mandla Gantsho, DBSA's managing director at the 2004 Annual SALGA Conference in Cape Town, South Africa on 27th September 2004.
[13] UNEP, Finance Initiative, Innovative Financing for Sustainability, Report on African Banking, 2004.
[14] Development Finance Institutions: Experiences of Land and Agricultural Development of South Africa (Land Bank) since 1912. Paper presented at DBSA Knowledge Week on 1–3 November 2004.
[15] See an article by Hendriks (2005) on the Challenges Facing Empirical Estimation of Household Food (in) security in South Africa in *Development Southern Africa Journal* **22**(1), March 2005, p. 103.

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